

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Peter B. Madoff et al. Art Unit : 2165
Serial No. : 09/392,018 Examiner : Forest Thompson Jr.
Filed : September 8, 1999
Title : OPENING PRICE PROCESS FOR TRADING SYSTEM

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY BRIEF

Pursuant to 37 CFR 1.193(b)(1), Appellant responds to arguments raised in the Examiner's Answer mailed on July 19, 2003, as follows:

Response to Rejections under 35 U.S.C. 112, second paragraph

Appellant relies upon the argument in the main brief.

Response to Prior Art Rejections

Appellant responds to the Examiner's Answer according to the claim groupings used in Appellant's main brief.

Claims 1, 2, 4, 10-12, 14, 21, 22, 24 and 25.

The examiner argues that Rickard portrays an action that occurs before the opening. (*Page 20 lines 19-20 Answer*). The examiner further contends that Appellant inferred in the Main Brief that Rickard was directed to the actions of the market makers in determining their "post-opening positions," as opposed to their "post-opening desired target positions." (*Page 20*

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lines 14-18 Answer) Appellant disagrees. Appellant specifically argued in the main brief that Rickard is directed to "post-opening desired target positions."

The thrust of the argument in Appellant's Main Brief is not addressed in the Examiner's Answer. Appellant has clearly refuted the use of Rickard's teachings of an optional output of opening volatilities as describing or suggesting "posting an allocation message to market maker participants to communicate the market makers participants expected allocations of the imbalance for execution at initial opening of the market," as recited in Claim 1. In claim 1, the imbalance is directed to the difference between buy orders and sell orders received prior to market opening, whereas Rickard is directed to an optional output of pricing variables used in a theoretical pricing model for calculating implied volatilities. This teaching is insufficient to suggest the claim limitation.

The examiner also argues that the *outputs* of Rickard provide the functionality of messages (*Page 21 lines 11-12 Answer*) as claimed by Appellant. However, the examiner has not pointed out plural outputs in the teachings of Rickard. This set of claims is not anticipated by the reference since Rickard does not show all of the elements of Claim 1 arranged as recited in Claim 1. Therefore these claims should be allowed.

Claims 3, 13, 23 and 26-31.

This set of claims deals with the feature of a second message. Appellant claims in this group recite two different messages, one message being the "share allocation message" of base claim 1, and the second message being "a current imbalance between buy and sell orders," which in aspects of the invention, is disseminated broadly to market participants and the public in general.

The examiner deliberately misconstrues the teachings of Rickard to fabricate support for two messages. The examiner attempts to find two messages in Rickard by quoting from column 11, lines 19-23 set out below:

The output of the first stage is a set of prices (implied volatilities) for each series (106). All trades that can occur at that price are executed, and there generally will be, at this stage, a residual

imbalance of non-matched orders. In stage two, each market maker inputs via the market maker terminals (4-10) his or her actual position and desired position (108). (Col. 11, lines 19-23).

and column 7, lines 14-17 set out below:

The opening prices and corresponding volatilities, once determined by the present invention, can be output to market makers (and, if seen as desirable, to other interested parties) so as to assist market makers to determine their post-opening desired target position.
Col. 7, lines 14-17.

The examiner misleads the Board by citing those two passages to support his contention that Rickard discloses two outputs (messages). Rickard does not possess two outputs. The output at column 7, lines 14-17 is the same output described at column 11, lines 19-23. What the examiner fails to point out is that the output from column 7, lines 14-17 is found in the Summary of the Invention section of the Rickard patent and is merely summarizing in slightly different words that which Rickard describes in the Detailed Description at column 11, lines 19-23. Rickard describes one and only one output. The examiner's misconstruction of Rickard is erroneous and misleading.

Rickard does not provide any teachings directed to a second message that is distinct from the message recited in independent claim 1. Appellant's claim 3 calls for two different messages, the "anticipated share allocation" message of claim 1 and the "share imbalance message" of claim 3. The examiner has not found teachings in Rickard that correspond to either of the Appellant's recited messages.

The output that is the subject of column 7, lines 14-17 (indicated in bold below) and associated context (Col. 6, line 61 to col. 7, line 29) is reproduced below:

In the representative embodiment of the present invention, the first stage can be formulated as an optimization problem. At one extreme, there is the optimum implied volatility that can be determined so that there is absolute consistency in implied volatility across all series. At the other extreme, there is the optimum volatility of each individual series that can be determined

to satisfy market supply and demand. The present invention computes a set of opening implied volatilities that set a reasonable compromise between these extremes. From these implied volatility value(s), the corresponding price is determined for each option series. The present invention also enables an exchange (or other entity) to determine the compromise point between these two positions. Alternatively, this compromise point can be market driven at the opening by a number of predetermined variables and/or be required to fall within specified bounds.

It will be appreciated that, with the appropriate computer hardware and software, the opening volatilities and price for all series can be determined substantially simultaneously.

The opening prices and corresponding volatilities, once determined by the present invention, can be output to market makers (and, if seen as desirable, to other interested parties) so as to assist market makers to determine their post-opening desired target position.

In the representative embodiment of the present invention, the second stage can be regarded as a subsequent optimization problem that minimizes a cumulative measure of deviation between post-opening desired target and actual positions of market makers, subject to the constraint that all public order imbalances across the series must be offset. This second optimization problem can be solved according to the present invention as a quadratic integer programming problem with linear equality constraints.

At the second stage, each market maker supplies as input his or her current delta and gamma positions prior to the opening and his or her desired delta and gamma positions after the opening. (If required, other measures, such as theta, rho and vega, also could be included as target variables.) Public orders are allocated to market makers according to the solution to this second optimization problem. (Col. 6, line 61 to col. 7, line 29)

It is clear that the output referred to in column 7, lines 14-17 is directed to outputting a set of opening implied volatilities that are determined by examining an optimum implied volatility across all series of an option and an optimal volatility of each individual series. These implied volatilities are used as input to a second stage optimization, which is regarded by Rickard as solving a problem of minimizing a cumulative measure of deviation between post opening desired target and actual pricing variables chosen by market makers.

The text from Rickard at column 11, lines 19-25 (indicated in bold) and excerpts from associated context (Excerpts from col. 10, line 60 to column 11, line 32) is also reproduced below:

The output of the first stage is a set of prices (implied volatilities) for each series (106). All trades that can occur at that price are executed, and there generally will be, at this stage, a residual imbalance of non-matched orders. In stage two, each market maker inputs via the market maker terminals (4-10) his or her actual position and desired position (108). This input to the present invention can be in the form of two sets of deltas and gammas from each market maker. ***

First Stage Optimization

The first stage is to determine a reasonably consistent set of implied volatilities (which may, in general, incorporate a skew in implied volatility versus strike price) that will maximize the mutual satisfaction weighted volume of offsetting public orders across all series at the opening. ***

At one extreme, the present invention could allow each series to open independently, using a single price call that is based solely on supply and demand in each series, without regard to any resulting implied volatility inconsistencies. ***

Allowing each series to open individually, using a single price call that is based solely on supply and demand in each series would permit the market makers to offset the public order imbalances at prices most favorable to them (i.e., buying low, selling high), but might result in large implied volatility discrepancies across series and/or lower traded volume.

At the other extreme, the present invention could insist on the absolute consistency of a single implied volatility (or a set of implied volatilities satisfying a prescribed skew in volatility versus strike price), without regard to any corresponding imbalances in public orders. ***

Ideally, the present invention enables control of the operating point between these extremes in order to provide a compromise between these conflicting desires.

At the exchange's option, these opening volatilities could be output to the market makers (or other interested persons) prior to proceeding into the second stage optimization

of market maker assignments to public order imbalances. This would give the market makers more information upon which to determine their delta and gamma targets as detailed below.

Second Stage Optimization

After the above step, there generally will be a residual imbalance in the public orders in each series that does not match off between buyers and sellers. According to exchange rules, these residual imbalances among public orders must be offset by assigning the contra positions to the market makers.

The market maker assignment problem at the opening can be formulated as an optimization problem that minimizes a cumulative measure of deviation between the post-opening desired target and actual positions of the market makers, subject to the constraints that all public order imbalances across the series must be offset. To this end, define the following variables *** (Excerpts from col. 10, line 60 to column 11, line 32)

Analysis of the cited Rickard text from the Detailed Description describes the very same output that was summarized in Rickard's Summary of the Invention. Again, reading the passage from column 11, lines 19-25 in the context of the disclosure shows that Rickard provides an output that is the opening volatilities determined by one of the techniques disclosed in Rickard along with opening prices, as set out at column 11, line 13. These opening volatilities are used in the second stage optimization as described at column 11, line 25 et seq. to provide the post opening desired and actual positions of the market makers.

Accordingly, Rickard teaches only one output. While the output may correspond to a message, clearly Rickard does not teach two different messages or outputs, as required by the claim. Moreover, the "message" disseminated by Rickard does not correspond to either message in Appellants' claim 1 or claim 3 and therefore, the examiner's reliance upon the teachings at column 7, lines 14-17 and column 11, lines 19-25 as disclosing two different messages is clearly erroneous and misleading.

Claims 5-15.

The examiner contends that the messages at column 7 and column 11 are two different messages when, in fact, they are two different places in Rickard's patent describing the same

message. Again, this line of argument is deliberately misleading. Moreover, the examiner takes the erroneous position that one of the messages precedes the other message:

These disclosures (column 7, lines 14-17, column 11, lines 19-23), one prior to preceding to the second stage which occurs before market opening and one after the second stage, the second stage occurring before market opening describe two different communications to market makers.

Clearly, the output referred to in column 7 is an input to the second stage optimization in Rickard just as the output referred to in column 11 is an input to the second stage of optimization. Therefore, both of these "disclosures" occur prior to proceeding to the second stage. The examiner also takes the erroneous position that:

The second disclosure is the result of the second stage, which the first disclosure occurs before the second stage. These messages constitute periodic messages communicated (disseminated) to market makers that indicate a current imbalance and periodically determining an imbalance condition in posting the allocation message.

Again, Appellants contend that this reasoning is misleading because the examiner considers these as plural messages when in fact they are the same message which, according to the teachings of Rickard, is "optionally" disseminated and, if disseminated, is disseminated apparently once to market makers. Further, were these somehow considered to be different messages, the messages still indicate the same feature, namely the communication of opening volatilities, not different features, that is, "an expected share allocation" and "an imbalance condition," as recited in Appellant's claims.

Both disclosures (Summary of the Invention and Detailed Description in Rickard) of the output describe the output as the result of the first stage, which is used as input to the second stage. There is nothing in Rickard that describes an output periodically disseminated over regular intervals of time between the initial reception of orders and actual opening of the trading system.

Claim 16.

Appellant relies upon the arguments made in the main brief.

Claims 7, 8, 17 and 18.

The examiner takes the position that a willingness to trade may be expressed in the variables that a market maker may identify through the system as options or other criteria. Rickard identifies pricing variables. Appellant recites a novel "vehicle to trade" having specific characteristics that if met can result in execution of a trade with contra side interest. Appellant disagrees that "a predefined relative indication" is the functional equivalent of values of pricing variables.

Appellants' claim 7 is directed to the positive step of applying received "predefined relative indications." Appellants' specification defines a predefined relative indication as an expression of a willingness to trade, which resides in the system and remains dormant and unknown by other participants until executed. Whether or not implied volatilities are known to the market does not aid in anticipating or make obvious claim 7 since the implied volatilities are merely factors used in a mathematical model and cannot be applied to execute against orders to minimize an order imbalance that may exist subsequent to a lock in period which is also not described by Rickard.

Claims 9, 19, 20.

Appellant relies upon the arguments made in the main brief.

Claims 32-34.

Rickard correctly makes the distinction between components of a theoretical pricing model (implied volatilities) and trading positions. For instance, at column 4 lines 37-48, Rickard describes:

United States options markets are typically conducted using an "open outcry" trading method, by which competing floor brokers, representing public orders, and market makers trading for their

own accounts make bids and offers on the trading floor. Typically, trading takes place in a trading pit - a specific location on the trading floor of an exchange designated for the trading of a specific option class. A market maker is an exchange member on the trading floor who buys and sells options for his or her own account and who has the responsibility of making bids and offers and maintaining a fair and orderly market. A floor broker is a trader on an exchange floor who executes trading orders for the public.

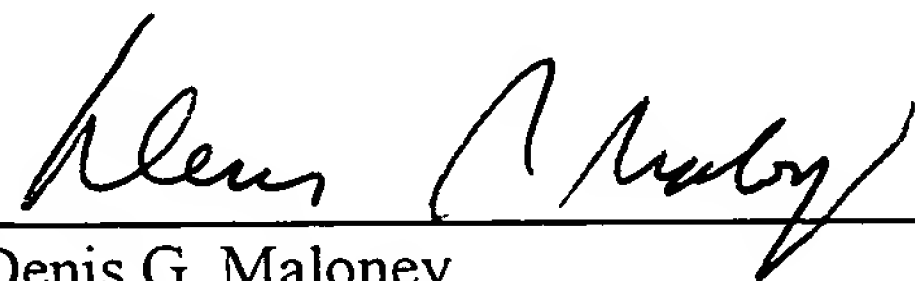
Rickard also describes, on the other hand, that theoretical option pricing models produce values that reflect an option's sensitivity to changes in one of five quantifiable factors (delta, gamma, theta, rho and vega). These factors are mathematical variables, i.e., measures of price volatility. These variables are not measures of an "imbalance condition between received buy orders and received sell orders" or "allocations of the imbalance" or dissemination of a plurality of "market imbalance messages" to the public. The examiner's attempt to equate the pricing parameters of a theoretical pricing model to order imbalance features, as recited in Appellant's claim 32, is clearly erroneous and misleading.

Appellant submits that the rejections are in error and the final rejection should be reversed. Accompanying this Reply Brief is a Request for Oral Hearing.

Please apply any charges or credits to Deposit Account No. 06-1050.

Respectfully submitted,

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